

REMARKS

In response to the Office Action mailed December 6, 2005, the Applicant respectfully requests reconsideration. To further the prosecution of this Application, the Applicant submits the following remarks and has added new claims. The claims as now presented are believed to be in allowable condition.

Claims 1-28 were pending in this Application. Claims 2-5, 14-17, and 25-27 have been withdrawn. Claims 29-31 have been added. Accordingly, claims 1, 6-13, 18-24, and 28-31 are now pending in this Application. Claims 1, 13, and 28 are independent claims.

Election/Restriction

The Office Action references a prior telephone conversation on November 25, 2005 with Applicant's Representative, David E. Huang, in which Mr. Huang elected Species V of Group I without traverse. The Applicant hereby affirms the election of Group I, Species V without traverse, namely, claims 1, 6-13, 18-24, and 28.

Allowed Claims

Claims 9-10 and 21-22 were objected to as being dependent on a rejected base claim but were deemed allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims. The Applicant reserves the right to amend the claims as described above until Applicant receives a reply to Applicant's request for reconsideration of claims 1, 6-8, 11-13, 18-20, 23-24, and 28.

Rejections under §102

Claims 1, 6-8, 11-13, 18-20, 23-24, and 28 were rejected under 35 U.S.C. §102(e) were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,909,052 to Haug et al., hereinafter Haug. The Applicant respectfully

traverses each of these rejections and requests reconsideration. The claims are in allowable condition.

The Applicant's independent claims 1, 13, and 28 have been rejected. Taking independent claim 1 as an example, the claim relates to a circuit board that includes a first signal layer having a signal conductor and a contact pad in electrical communication with the signal conductor. The circuit board also includes a second signal layer substantially parallel to the first signal layer where the second signal layer has a conductive plane defining an opening. The opening is substantially aligned with the contact pad and the opening is configured to minimize a signal reflection of a signal transmitted through the signal conductor and across the contact pad. The circuit board also includes a nonconductive layer disposed between the first signal layer and the second signal layer.

Haug relates to techniques for making a circuit board. In Haug, a circuit board 26 includes multiple circuit board layers 28 which are sandwiched together into an integrated, rigid board. The layers 28 include a signal layer 30, another signal layer 32 and yet another signal layer 34. Also, as shown in FIG. 1, the signal layer 30 includes a set of conductors 46 (e.g., outer-layer surface traces). The set of conductors 46 includes a first set of differential traces 48 and a second set of differential traces 50. As recited by Haug, the differential pairs of traces 48, 50 have different impedances thus making the circuit board well-suited for accommodating circuitry that requires the different impedances in order to minimize signal reflection and provide robust signal integrity (Column 5, lines 5-9).

As further disclosed by Haug, the circuit board 26 includes a set of plated through-holes (PTHs) 66 that extend from a top surface 68 of the circuit board 26 to a bottom surface 70 of the circuit board 26 through the circuit board layers 28.

The plated through-holes 66 electrically connect the conductive plane 52 of the signal layer 32 with the conductive region 56 of the signal layer 34. Column 5, lines 27-33. Conductive planes (e.g., the conductive plane 60 of the signal layer 42) which do not electrically connect with the plated through-holes 66 define anti-pads 76 (i.e., non-conductive areas) that surround the plated through-holes 66 thus avoiding direct contact with the metallic shells 72 of the plated through-holes 66. Column 5, lines 41-46.

Independent claims 1, 13, and 28 are not anticipated by Haug because Haug does not teach or disclose all of the elements of the independent claims.

The Office Action contends that Haug discloses a circuit board that includes a first signal layer (Haug's signal layer 30) having a signal conductor (Haug's set of conductors 46 having traces 48, 50) and a contact pad in electrical communication with the signal conductor.

The Office Action indicates that "a pad on a plated through hole" in Haug is equivalent to the Applicant's contact pad, as claimed. However, the Applicant is unclear as to which portion of Haug's plated through hole forms the "pad of the plated through hole" as contended by the Office Action. Is the ring or "ears" that extend from Haug's plated through hole onto the signal layer 30 being considered as the "contact pads" as claimed by the Applicant? In order for the rejection of claims 1, 13, and 28 to be maintained, the Applicant respectfully requests that it be pointed out with particularity where the cited prior art teaches such a "pad formed on the plated through hole."

Furthermore, assuming that the plated through hole of Haug does have a contact pad, there is no teaching or suggestion of "a signal conductor and a contact pad in electrical communication with the signal conductor" as claimed by the Applicant. The Office Action contends that a contact pad of the plated

-12-

through hole is in electrical communication with the signal conductor 46 having traces 48, 50. As recited above, the signal layer 30 of Haug includes differential pair traces 48, 50 that have different impedances to minimize signal reflection. Furthermore, in Haug, the circuit board 26 includes a set of plated through-holes (PTHs) 66 that ***electrically connect the conductive plane 52 of the signal layer 32 with the conductive region 56 of the signal layer 34***. There is no teaching or suggestion in Haug that the plated through hole or a “contact pad” associated with the plated through hole is in electrical communication with the signal conductor (e.g., Haug’s differential pair traces 48, 50), such as claimed by the Applicant.

Additionally, the Applicant’s independent claims recite an opening as being substantially aligned with the contact pad where the opening is configured to minimize a signal reflection of a signal transmitted through the signal conductor and across the contact pad. Haug does not suggest an opening having such a configuration.

As recited in Haug, conductive planes that do not electrically connect with the plated through-holes 66 define anti-pads 76 (i.e., non-conductive areas) that surround the plated through-holes 66. There is no teaching or suggestion in Haug that the anti-pads “minimize a signal reflection of a signal transmitted through the signal conductor and across the contact pad” as claimed by the Applicant. The anti-pads merely “avoid direct contact with the metallic shells 72 of the plated through-holes 66.”

For the reasons stated above, independent claims 1, 13, and 28 patentably distinguish over the cited prior art, and the rejection of claim 1 under 35 U.S.C. §102(e) should be withdrawn. Accordingly, claims 1, 13, and 28 are in allowable condition. Furthermore, claims 6-13 depend from and further limit

claim 1 and claims 18-24 depend from and further limit claim 13. Claims 6-13 and 18-24 are in allowable condition for at least the same reasons.

Newly Added Claims

Claims 29-31 have been added and are believed to be in allowable condition. Claims 29-31 depend from independent claim 28. The claims include subject matter found in claims 6, 9, and 10 as originally filed and as previously examined. No new matter has been added by the amendment and the amendment does not raise new issues that require further searching and consideration.

-14-

Conclusion

In view of the foregoing remarks, this Application should be in condition for allowance. A Notice to this affect is respectfully requested. If the Examiner believes, after this Response, that the Application is not in condition for allowance, the Examiner is respectfully requested to call the Applicant's Representative at the number below.

The Applicant hereby petitions for any extension of time which is required to maintain the pendency of this case. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 50-3661.

If the enclosed papers or fees are considered incomplete, the Patent Office is respectfully requested to contact the undersigned collect at (508) 616-2900, in Westborough, Massachusetts.

Respectfully submitted,



Jeffrey J. Duquette, Esq.
Attorney for Applicant
USPTO Registration No.: 45,487
Bainwood, Huang & Associates, LLC
Highpoint Center
2 Connector Road,
Westborough, Massachusetts 01581
Telephone: (508) 616-2900 (Main)
Facsimile: (508) 366-4688 (Fax)

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